Original Article

Impact of Detak Mobile Application in Early Detection of Acute Coronary Syndrome in the Covid-19 Pandemic in Blitar Regency Indonesia

Novita Ana Anggraini, Faridah Mohd Said, Nur Syazana Umar, Rahmania Ambarika, Sandeep Poddar

Abstract:

Introduction: The Covid pandemic has had an impact on reducing the number of emergency room visits in cases of acute coronary syndrome (ACS). This will have a negative impact when the decrease in the number of emergency room visits by ACS patients results in delays in treatment. Online education through applications can be a solution to increasing knowledge without having to violate health protocols due to crowds during the Covid-19 pandemic. This study aims to determine the effect of the DETAK mobile application on the early detection of ACS during the Covid-19 pandemic.

Methods: This study will use a quantitative research design with a quasi-experimental pretest and posttest with a control group. This study applied a quantitative research design. A total of 252 respondents who met the inclusion criteria were randomly divided into control and intervention groups. The intervention group was given education through the DETAK application, and the control group was given conventional education about ACS. Before the intervention was given, a pre-test was conducted in both groups and after the intervention, a post-test was performed on both.

Results: The results of the study showed that there was an increase in the ability to detect ACS earlyin the control group (p=0.025) and the intervention group (p < 0.001). Results from the bivariate analysis showed that there were differences in the ability of early detection between the intervention and control groups (p< 0.001).

Conclusions: There was an effect of using the DETAK mobile application on increasing knowledge of risk factors and symptoms of ACS which has an impact on increasing the ability to detect early symptoms of ACS during the Covid-19 pandemic.

JK-Practitioner2023;28(1-2):17-24

INTRODUCTION

In 2020, the coronavirus caused a large number of people in Indonesia to get pneumonia. This had a big effect on health services. The main focus of health services during a pandemic is treating patients with Covid-19. The ease of transmission of the coronavirus has resulted in restrictions on activities and a reduction in non-urgent cases in health services. Furthermore, the Covid-19 epidemic has placed a lot of strain on already overburdened healthcare systems, raising questions about their ability to handle the demands of intensive care treatments [1]. Every attempt has been made to provide as many patients as possible with the opportunity to be admitted and treated in hospitals. The usual clinical practise has been entirely altered, and all non-urgent treatments have been cancelled. Acute coronary syndrome (ACS) management has grown more difficult and less common as a result of underestimating screening and elective therapies for coronary artery disease (CAD) in the setting of a stressed healthcare system. Despite this, ACS continues to be a leading cause of morbidity and mortality globally, accounting for more than 1 million hospital admissions each year in the US, while ischemic heart disease is to blame for almost 1.8 million deaths yearly in Europe, or 20% of all fatalities [2]. The prevalence of heart disease in Indonesia, which is diagnosed by a doctor in a population of all ages

Author Affiliations

Novita Ana Anggraini, Institute Health of Science STRADA Jl. Manila No.37, Tosaren, Kec. Pesantren, Kota Kediri, Jawa Timur 64133, Indonesia**, Faridah Mohd Said** Lincoln University College, Wisma Lincoln, 12-18, Jalan SS 6/12, 47301 Petaling Jaya, Selangor, Malaysia **, Nur Syazana Umar** Lincoln University College, Wisma Lincoln, 12-18, Jalan SS 6/12, 47301 Petaling Jaya, Selangor, Malaysia **, Rahmania Ambarika,** Institute Health of Science STRADA Jl. Manila No.37, Tosaren, Kec. Pesantren, Kota Kediri, Jawa Timur 64133, Indonesia**, Sandeep Poddar,** Lincoln University College, Wisma Lincoln. 12-18, Jalan SS6/12 47301 Peraling Jaya, Selangor, Malayasia

Correspondence

Novita Ana Anggraini Lincoln University College, Wisma Lincoln. 12-18, Jalan SS6/12 47301 Petaling Jaya, Selangor, Malayasia

Phone no: +6285646306636, Email: phitphita@gmail.com

Indexed

EMBASE ,SCOPUS, IndMED ,ESBCO, Google Scholar besides other national and International Databases

Cite This Article as

Anggraini NA, Said FM, Ambarika R, Poddar S.Impact of Detak Mobile Application in Early Detection of Acute Coronary Syndrome in the Covid-19 Pandemic in Blitar Regency Indonesia. JK Pract2023;28(1-2):17-24

Full length article available at **jkpractitioner.com** one month after publication

Keywords

Education, early detection, acute coronary syndrome, mobile application.

is 2 million cases. According to the doctor's diagnosis, the urban areas (1.6%) are higher than the rural areas (1.3%) [3]. The Covid pandemic has also had an impact on reducing the number of emergency room visits in cases of acute coronary syndrome (ACS). This will have a negative impact when the decrease in the number of emergency room visits by ACS patients results in delays in treatment [1,4]. Time is an important factor in the treatment of ACS. Prehospital delay will reduce the prognosis and increase the complications of ACS [5]. This condition may increase the ACS mortality rate during the Covid-19 pandemic. Restricting the number of hospital visits in non-Covid-19 patients can have an impact on delays in treatment for ACS which can have an impact on increasing mortality due to ACS [2,4].

Increased ACS mortality during the Covid pandemic can be avoided by providing proper education about the early detection of ACS. Improving the ability to detect ACS can increase the accuracy of seeking help so that prehospital delays can be prevented [6,7]. ACS patients can make the right decision when they should immediately come to IDG for treatment. This will reduce the negative impact caused by limiting the number of hospital visits for ACS patients [5]. Education related to improving the early detection of ACS can be done through an online application to minimize physical contact [8,9].

Online education through applications can be a solution to increasingknowledge without having to violate health protocols due to crowds. Moreover, a survey from the Indonesia Internet Service Provider Association (APJII) shows Indonesia as the largest internet user in Asia-Pacific. This condition shows the potential for using education through mobile applications to increase the ability for early detection of ACS [8,10]. Thus, this study aims to determine the effect of the DETAK mobile application on the early detection of ACS during the Covid-19 pandemic.

METHOD

This study applied a quantitative research design with a quasi-experimental pre- and post-test with the control group. The population of this study was the community with a high risk of ACS in Blitar with 4282 cases of cardiovascular disease. The samples obtained in Blitar regency with 22 public health centre sub-districts, are Bakung, Binangun, Doko, Gandusari, Garum, Kademangan, Kanigoro, Kesamben, Nglegok, Panggungrejo, Ponggok, Sanankulon, Selorejo, and Selopuro. From the 22 sub-districts, the 4 with the highest ACS incidence rate, are Srengat, Wonodadi, Kademangan, and Selorejo. The sampling technique used in this study was a probability sampling technique. This technique is used to determine samples from wide population such as recidents of a regency/city, province, and state. From 22 Blitar sub-districts were choosen 4 sub-districts with the highest incidence of cardiovascular disease, the 4 areas were Srengat, Wonodadi, Kademangan, and Selorejo. Furthermore, in each sub-district, a health center was selected in the area with the highest incidence of heart disease. The samples in this study have been calculated using G*power. The researcher decided to use a large effect size suggested by cohen d (0,8) with α= 0,05, β=0,95. The total number of respondents in this study was 252 with 126 in each group.

Inclusion criteria for this study were age >45 years; obesity; smoking; history of hypertension, diabetes mellitus, hyperlipidemia, hypercholesterol and, CVD; family history of cardiovascular disease, hypertension, diabetes mellitus, hyperlipidemia; patients who were willing to be respondents. Exclusion criteria from this study were a community with no high risk for ACS, and patients who were not willing to be respondents.

The instrument for this study was a checklist sheet that was divided into 3 sections, sociodemographic data, clinical factors, and early detection skills. This questionnaire was modified from several works of literature (socio demographic profile was adoptedfrom Ferwana (2013)[11], clinical factors instrument was adopted from Ralapanawa et al., (2019)[12], early detection instrument was adopt from Collet et al., (2021))[13]. Some of the questions asked in the sections on early detection skills were about recognising, measuring, understanding, and mentioning ACS symptoms.

The mobile application used in this study was DETAK. DETAK is a mobile-based application developed by researchers with attention to literature studies related to information needs to increase knowledge and early detection abilities of ACS patients. This application has knowledge and practice features. In the knowledge menu, respondents were asked to fill out the questionnaire in the application, which includes age, sex, knowledge of coronary artery disease, and signs and symptoms of coronary artery disease that they have experienced. Whereas the practice menu contains coronary artery disease management taken recommendations based on the results of early detection measurements using the application.

The data collection process was carried out from March to June 2022. The data used in quantitative research were primary and secondary . Primary data were obtained from interviews conducted directly with respondents, and then the researcher filled out observation sheets according to the data submitted by respondents. Secondary data was obtained from reports or health documents from the Blitar Public Health Centre and other data that supported the research, such as supporting documents and an overview of the research site.

In this study, the people who took part were evaluated based on their condition before they were put in either the DETAK application group or the control

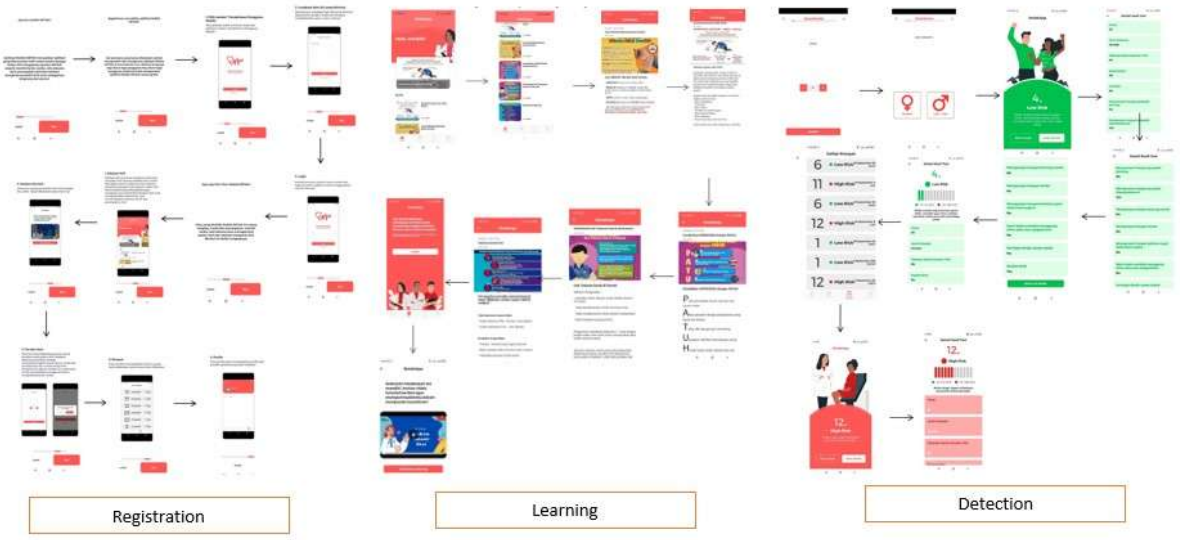

Figure 1. DETAK application from registration until detection ACS

group. After that, respondents were given information on the early detection of ACS through the DETAK application for the intervention group. For the control group, conventional health promotion will be provided using leaflets periodically to increase the ability of early detection of ACS. For the intervention group, the researcher use DETAK based on android mobile application. The respondent follow the instruction in figure 1 of DETAK application from registration until detection ACS.

After a month of intervention, the researcher conducted a post-test to measure the ability of respondents to achieve early detection in preventing ACS. To evaluate the ability of early detection of ACS in both groups was carried out by giving questionnaires about the ability to recognize the signs of ACS symptoms being felt, the ability to recognize risk factors for ACS, and the ability to make quick decisions after feeling ACS symptoms. The scores of the pre-test and post-test early detection results will be analyzed using a bivariate test to see differences in early detection abilities in each group and compare the differences between groups.

A Chi-Square test was carried out to describe the sociodemographic data (Age, BMI, Gender, Education, Marital status, Health Insurance, Employment Status) and the clinical factor of ACS. The bivariate analysis was carried out using the Wilcoxon test to analyze the effect of the DETAK app for early detection of ACS in the control and intervention groups. Mann-Whitney test was carried out to analyze the difference in the early detection of ACS after receiving DETAK in the control and intervention groups.

Ethical Approval

This research got approval from the Health Research Ethic Committee of the Institute Health of Science STRADA with number 3102/KEPK/VI/2022 dated June 29, 2022.

RESULT

The data in table 1 show that the respondents experience hypertension in both the control group (68.7%) and the intervention group (72.2%). Most of them had no history of diabetes mellitus in both groups with the percentages being 70.6% and 69.8% for the control and intervention groups, respectively. However, the clinical factors of hyperlipidemia indicated most of them did not have it(79.4%) in the control group while most of them in the intervention group had it (69.8%). Meanwhile, when viewed from the aspect of smoking history, both groups showed the same results as most of them had a smoking history in the control group (68.3%) and the intervention group (73.8%). Other clinical factors suggested that most of the respondents had an overweight BMI. The number of respondents who had an overweight BMI was 37.3% in the control group and 38.1% in the intervention group. Most of the respondents participating in the study had an ACS history, with 59.5% in the control group and 65.1% in the intervention group. Meanwhile, the results of the analysis indicated that all clinical factor variables had a p-value > 0.05, suggesting that the control and intervention groups are homogeneous.

The results of the research shown in the table above indicate that the ages of most respondents are in the range of 45-59 years old in both the control group (50%) and intervention group (54%). Most of them are female, with 54.8% in the control group and 57.9% in the intervention group. Respondents in this research have a good education, and most of them finished their high school education (SMA). When viewed from other aspects such as marital status, most of both the control group (92.9%) and the intervention group (92.1%) were married. Most of the respondents participating in this research had BPJS health insurance, both in the control group (85.7%) and the intervention group (92.1%). Most of them also worked in the control group (54%), as did 47.6% of

those in the intervention group.

Table 1: Characteristics of Respondents

Variables		Groups			
		Control		Intervention	
		F	%	f	%
Hypertension	Yes	86	68.3	91	72.2
	No	40	31.7	35	27.8
	Total	**126**	**100**	**126**	**100**
Diabetes mellitus	Yes	37	29.4	38	30.2
	No	89	70.6	88	69.8
	Total	**126**	**100**	**126**	**100**
Hyperlipidemia	Yes	26	20.6	88	69.8
	No	100	79.4	38	30.2
	Total	**126**	**100**	**126**	**100**
Current smoker	Yes	40	31.7	33	26.2
	No	86	68.3	93	73.8
	Total	**126**	**100**	**126**	**100**
Obesity/BMI	<18.5 : underweight	20	15.9	20	15.9
	18.5-24.9 : normal weight	27	21.4	32	25.4
	25.0-29.9 : overweight	47	37.3	48	38.1
	30.0-34.9 : obesity class I	32	25.4	26	20.6
	35.0-39.9 : obesity class II	0	0	0	0
	>40 : obesity class III	0	0	0	0
	Total	**126**	**100**	**126**	**100**
History ACS	Yes	75	59.5	82	65.1
	No	51	40.5	44	34.9
	Total	**126**	**100**	**126**	**100**
Age	<45 years old	22	17.5	23	18.3
	45-59 years old	63	50.0	68	54.0
	60-75 years old	41	32.5	35	27.8
	>75 years old	0	0	0	0
	Total	**126**	**100**	**126**	**100**
Gender	Male	57	45.2	53	42.1
	Female	69	54.8	73	57.9
	Total	**126**	**100**	**126**	**100**
Education	Elementary school	33	26.2	30	23.8
	Junior high school	27	21.4	35	27.8
	Senior high school	44	34.9	42	33.3
	Bachelor's	22	17.5	19	15.1
	Total	**126**	**100**	**126**	**100**
Marital status	Single	9	7.1	10	7.9
	Married	117	92.9	116	92.1
	Total	**126**	**100**	**126**	**100**
Health insurance	Non BPJS	18	14.3	10	7.9
	BPJS	108	85.7	116	92.1
	Total	**126**	**100**	**126**	**100**
Employment status	Employed	68	54.0	60	47.6
	Unemployed	42	33.3	50	39.7
	Retired/Sickness disability	16	12.7	16	12.7
	Total	**126**	**100**	**126**	**100**

*Chi Square Test

The data in Table 2 shows an increase in the ability to detectACS early in the control group with a p-value 0,025 and a p-value < 0,001 in the intervention group. A negative rank indicated a decrease in post-test scores as there was only 1 respondent in the intervention group and 4 respondents in the control group. Positive rank represents an increase in post-test scores, where an increase in post-test scores in the intervention group was higher (66 respondents) than that of the control group (13 respondents). Tie scores neither increased nor decreased where the control group showed a higher tie score (109 respondents)

Table 2: Result of the Impact of Pre and Post DETAK

Groups			N	Mean Rank	Sum of Ranks	Median	*Interquartile Range*	*p*
Control	Early detection of ACS	Negative Ranks	4	8.50	34.00	8.00	1	0.025*
		Positive Ranks	13	9.15	119.00			
		Ties	109					
		Total	**126**					
Intervention	Early detection of ACS	Negative Ranks	1	28.50	28.50	10.00	2	0.000*
		Positive Ranks	66	34.08	2249.50			
		Ties	59					
		Total	**126**					

*Wilcoxon Test

Table 3: The difference between early detection and preventing treatment of ACS

Group		N	Mean Rank	Sum of Ranks	Median	Interquartile Range	*P*
Early detection of ACS	Control	126	103.37	13025.00	1.5000	1.00	0.000
	Intervention	126	149.63	18853.00			
	Total	**252**					

compared with the intervention group (59 respondents). This proved that the DETAK application can be used effectively for the early detection of ACS independently.

The results of the research shown in the table above indicated that there was a significant difference between the control and intervention groups in the respondent's ability to early detect with p-value < 0,001. This showed that the use of the DETAK application had an effect on improving the ability for early detection of ACS. The weakness of this study was not carrying out an analysis of the confounding factors so that it has the potential to trigger bias in the research results. This can be used to improve future research to include countering factors in the analysis to minimize bias.

DISSCUSSION

DETAK is an android-based mobile application that was developed to help people in the community understand ACS comprehensively. It provides health information about ACS, assessing ACS risk factors based on the results of the literature and expert opinion, as well as ACS management. This indicated that the DETAK application can be used effectively for the early detection of ACS in an independent manner.. The DETAK app makes it easy to gain ACS-related knowledge in a fun way. Audio-visual media provides a fun learning experience so that understanding related to ACS symptom signs becomes better [8]. This is in line with research showing the effectiveness of using mobile applications to improve the early detection of ACS symptoms. The DETAK application is very easy to access and learn from combining audio-visual elements through educational videos and infographics that make it easier for respondents to understand the symptoms and risk factors of ACS. Attractive virtual media will provide a pleasant stimulus and learning experience that will increase understanding [14].

Increased knowledge about the risk factors and symptoms of ACS will increase patient self-efficacy [15,16]. Patients can recognize any ACS symptoms that may appear during an attack. This condition will reduce stress due to increased problem-solving skills due to sufficient knowledge in recognizing the symptoms of ACS that they feel [17,18]. With the DETAK app, patients will know and be able to assess the symptoms of ACS they are feeling, so they can prevent prehospital delays due to prolonged early detection [19].

Differences in how educational materials about ACS were given to the control and intervention groups affected how early ACS could be found.The conventional method given to the control group places patients more passively in seeking information, so theirlevel of understanding will be less than optimal and highly dependent on health workers [8,9]. The conventional method will also limit material repetition because there are no audio-visual media that they can access independently. This condition will make learning motivation decrease because patients will feel they do not have a great need to learn or

motivation because of their passive role in learning [9].

In the intervention group, on the other hand, patients worked together to find the information they needed.This condition will make them more motivated to learn new knowledge so that their level of understanding will be more optimal [8]). The flexible Detak application makes it very easy for patients to choose their study material and time. The use of the DETAK application also greatly facilitates the process of repeating material according to what they need. Coupled with interactive and interesting learning media, the learning experience will be more enjoyable [9,20,21]. This condition increases the level of understanding of ACS symptoms in the intervention group, which will increase the ability to detect ACS early.

Even so, 113 out of 126 people in the control group and 60 out of 126 people in the intervention group did not notice an improvement in their ability to spot early ACS.One of the inhibiting factors for the early determination of ACS is age. There are more than 30% of respondents over 60 years old. This causes a less optimal level of understanding of ACS symptoms due to decreased cognitive ability. In addition, elderly respondents have difficulty using the application. This difficulty will limit their access to the material they need so that their understanding of the signs and symptoms of ACS is less than optimal [5,6].

The Covid-19 pandemic has limited everyone's activities, including non-urgent routine health check-ups to minimize prevention. This makes patients who have risk factors that are not optimally controlled so that there is a potential for ACS attacks to occur [1,2,4]. Because of the COVID-19 epidemic, there were fewer medical/educational consultations, therefore home visits and club activities were cancelled. [22,23] The DETAK application provides information about risk factors and actions that must be taken to prevent an ACS attack. Knowing the risk factors you have, will increase your awareness of ACS. Someone who has a high ACS risk factor will tend to be careful and sensitive about the symptoms they feel [8,17]. This condition will increase the speed of early detection of ACS so that decisions to seek help from health services can be made quickly and accurately in a pandemic [1,2,4,24]. Reducing prehospital delay due to the increased ability to detect early ACS will reduce complications and improve the prognosis of ACS [6,25]. This shows that the DETAK application can improve early detection in ACS patients by increasing knowledge of the risk factors and symptoms of the disease.

CONCLUSION

There was an effect of using the DETAK mobile application on increasing knowledge about risk factors and symptoms of ACS which has an impact on increasing the ability to detect early symptoms of ACS during the Covid-19 pandemic with p-value < 0,001.

ACKNOWLEDGEMENT

The authors would like to thank all respondents and the team who participated in this research and are also thankful to the Institute Health of Science STRADA & Lincoln University College for academic support.

REFERENCES

1. Mafham MM, Spata E, Goldacre R, Gair D, Curnow P, Bray M, et al. COVID-19 pandemic and admission rates for and management of acute coronary syndromes in England. The Lancet [Internet]. 2020;396(10248):381–9. https://doi.org/10.1016/S0140-6736(20)31356-8
2. Schiavone M, Gobbi C, Biondi-Zoccai G, D'Ascenzo F, Palazzuoli A, Gasperetti A, et al. Acute coronary syndromes and Covid-19: exploring the uncertainties. J Clin Med. 2020;9(6):1683. **https://doi.org/10.3390/jcm9061683**
3. Kemenkes RI. Profil Kesehatan Indonesia 2020. Kementrian Kesehatan Republik Indonesia. 2021;139.
4. Ashraf S, Ilyas S, Alraies MC. Acute coronary syndrome in the time of the COVID-19 pandemic. Eur Heart J [Internet]. 2020 Jun 7;41(22):2089–91. https://doi.org/10.1093/eurheartj/ehaa454
5. Arrebola-Moreno M, Petrova D, Garcia-Retamero R, Rivera-López R, Jordan-Martínez L, Arrebola JP, et al. Psychological and cognitive factors related to prehospital delay in acute coronary syndrome: A systematic review. Int J Nurs Stud. 2020 Aug 1;108:103613. https://doi.org/10.1016/j.ijnurstu.2020.103613
6. Garrido D, Petrova D, Catena A, Ramírez-Hernández JA, Garcia-Retamero R. Recognizing a Heart Attack: Patients' Knowledge of Cardiovascular Risk Factors and Its Relation to Prehospital Decision Delay in Acute Coronary Syndrome. Front Psychol. 2020 Aug 25;11:2056. https://doi.org/10.3389/fpsyg.2020.02056
7. Khaled MFI, Adhikary DK, Islam MM, Alam MM, Rahman MW, Chowdhury MSIT, et al. Factors Responsible for Prehospital Delay in Patients with Acute Coronary Syndrome in Bangladesh. Medicina (B Aires). 2022;58(9):1206. **https://doi.org/10.3390/medicina58091206**
8. Dwairej L, Ahmad M. Hypertension and mobile application for self-care, self-efficacy and related knowledge. Health Educ Res. 2022;37(3):199–212.

9. Zahid T, Alyafi R, Bantan N, Alzahrani R, Elfirt E. Comparison of effectiveness of mobile app versus conventional educational lectures on oral hygiene knowledge and behavior of high school students in Saudi Arabia. Patient Prefer Adherence. 2020;14:1901. https://doi.org/10.1093/her/cyac012
10. Crandall K, Shake M. A mobile application for improving functional performance and health education in older adults: A pilot study. Aging Sci. 2016;4(151):2. 2 http://dx.doi.org/10.4172/2329-8847.1000151
11. Ferwana M. Socio-demographic and racial differences in acute coronary syndrome: Comparison between Saudi and South Asian patients. Journal of Family Medicine and Primary Care. 2013 Jan;2(1):64. https://doi.org/10.4103%2F2249-4863.109950
12. Ralapanawa U, Kumarasiri PV, Jayawickreme KP, Kumarihamy P, Wijeratne Y, Ekanayake M, Dissanayake C. Epidemiology and risk factors of patients with types of acute coronary syndrome presenting to a tertiary care hospital in Sri Lanka. BMC cardiovascular disorders. 2019 Dec;19(1):1-9. https://doi.org/10.1186/s12872-019-1217-x
13. Collet, J. P., Thiele, H., Barbato, E., Bauersachs, J., Dendale, P., Edvardsen, T., Gale, C. P., Jobs, A., Lambrinou, E., Mehilli, J., Merkely, B., Roffi, M., Sibbing, D., Kastrati, A., Mamas, M. A., Aboyans, V., Angiolillo, D. J., Bueno, H., Bugiardini, R., … Siontis, G. C. M. (2021). 2020 ESC Guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation. In European Heart Journal (Vol. 42, Issue 14, pp. 1289–1367). Oxford University Press. https://doi.org/10.1093/eurheartj/ehaa575
14. Rufaindah E, Patemah P. Application of "Stunting Prevention" Android-Based Applications to Mother Knowledege and Nutritional Status of Toddlers Ages 0-36 Months. Jurnal Kebidanan. 2021;11(1):41–6. https://doi.org/10.31983/jkb.v11i1.6462
15. Demisse L, Alemayehu B, Addissie A, Azazh A, Gary R. Knowledge, Attitudes and Beliefs About Acute Coronary Syndrome Among Patients Diagnosed With Acute Coronary Syndrome, Addis Ababa, Ethiopia. 2022 [cited 2022 Jun 21]; https://doi.org/10.21203/rs.3.rs-1435311/v1
16. Dijkhuis TE, Bloem F, Kusters LAJ, Roos SM, Gordijn SJ, Holvast F, et al. Investigating the current knowledge and needs concerning a follow-up for long-term cardiovascular risks in Dutch women with a preeclampsia history: a qualitative study. BMC Pregnancy Childbirth. 2020;20(1):1–10. https://doi.org/10.1186/s12884-020-03179-1
17. Demisse L, Alemayehu B, Addissie A, Azazh A, Gary R. Knowledge, Attitudes and Beliefs About Acute Coronary Syndrome Among Patients Diagnosed With Acute Coronary Syndrome, Addis Ababa, Ethiopia. 2022 [cited 2022 Jun 22]; https://doi.org/10.21203/rs.3.rs-1435311/v1
18. Mirzaei S, Steffen A, Vuckovic K, Ryan C, Bronas UG, Zegre-Hemsey J, et al. The association between symptom onset characteristics and prehospital delay in women and men with acute coronary syndrome. European Journal of Cardiovascular Nursing. 2020;19(2):142–54. https://doi.org/10.1177/1474515119871734
19. Arrebola-Moreno M, Petrova D, Garrido D, Ramírez-Hernández JA, Catena A, Garcia-Retamero R. Psychosocial markers of pre-hospital decision delay and psychological distress in acute coronary syndrome patients. Br J Health Psychol. 2020;25(2):305–23. **https://doi.org/10.1111/bjhp.12408**
20. Hoschar S, Albarqouni L, Ladwig KH. A systematic review of educational interventions aiming to reduce prehospital delay in patients with acute coronary syndrome. Open Heart. 2020;7(1):e001175. http://dx.doi.org/10.1136/openhrt-2019-001175
21. Yusriani Y, Septiyanti S. The Impact of Community Health Education Media in the Industrialization Era on the Diet of High Risk Pregnant Women. Journal of Nonformal Education. 2021;7(2):259–67. http://dx.doi.org/10.15294/jne.v7i2.31793
22. Lolo WA, Citraningtyas G, Mpila DA, Wijaya H, Poddar S. Quality of Life of Hypertensive Patients Undergoing Chronic Disease Management Program during the COVID-19 Pandemic. Kesmas: Jurnal Kesehatan Masyarakat Nasional (National Public Health Journal). 2022 Nov 30;17(4):264-9. http://dx.doi.org/10.21109/kesmas.v17i4.6224
23. Sen S. SARS-CoV-2 and Environment: Transmission and Green Combat. International Journal of Advancement in Life Sciences Research. 2022 Apr 27;5(2):1-5. https://doi.org/10.31632/ijalsr.2022.v05i02.001
24. Sahu KK, Kumar R. Current perspective on pandemic of COVID-19 in the United States. J Family Med Prim Care [Internet]. 2020 Apr

30;9(4):1784–91. https://pubmed.ncbi.nlm.nih.gov/32670917

25. Michalski P, Kasprzak M, Siedlaczek M, Kubica A. The impact of knowledge and effectiveness of educational intervention on readiness for hospital discharge and adherence to therapeutic recommendations in patients with acute coronary syndrome. Medical Research Journal. 2020;5(2):72–8. https://doi.org/10.5603/MRJ.a2020.0023